
Security Assistance Automated Resource Management Suite Migrates to the Web

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The internet continues to expand in capability and with it the federal government has expanded its E-government initiatives. Data that resided in one location and provided to other locations by mail can now be centrally located with access around the world via web-based databases. Government organizations are reviewing their data requirements and considering migration of stand-alone systems to web-based systems.

The Department of Defense (DoD) is tasked with implementing the United States Security Cooperation Program. The Department of Defense designated the Defense Security Cooperation Agency (DSCA) responsible for operational control and budgeting. DSCA utilizes security assistance organizations (SAOs) in over 105 countries around the world to help accomplish this mission. These organizations receive multiple fund allocations and are required to accurately account for all funds expended. The Department of State (DoS) budget and fiscal office provides the majority of the financial, acquisition, and contracting support. The SAO is required to keep its own accounting records and feed them to the official accounting office, Defense Finance and Accounting Service-Denver Center (DFAS-DE) in Denver, Colorado for security cooperation funds. There is a specified accounting office for each type of fund.

The Department of Defense uses a suite of software developed in-house on the Microsoft Access platform to provide feeder accounting data to DFAS-DE. The software program is referred to as the Security Assistance Automated Resource Management Suite (SAARMS). Each SAO is provided with a stand-alone version of this software. It can be used on one workstation or on multiple workstations connected via a local area network. United States combatant commands believe that there are substantial benefits to migrating SAARMS from a stand-alone system into a web-based database with centralized processing and data storage [Marme, 2002]. This offering reviews the current database, and conducts a critical analysis of migrating SAARMS to the web. The current database review is based on the author's observations of the SAARMS program from 1995 through the present and interviews with current programmers and users of the system.

Security Assistance Automated Resource Management Suite

The Security Assistance Automated Resource Management Suite is a suite of software modules to assist the SAO in managing their resources. The module designed to support the budget execution process is the only module considered in this analysis and will be hence forth be referred to simply as SAARMS. SAARMS is a database program developed using Microsoft Access. It is currently in the Access XP version. The Defense Institute of Security Assistance Management (DISAM) is responsible for development, administration, and training support of SAARMS. This module serves as the security assistance (SA) funds management system. It is also used to manage non-SA funds. The program records and limits total document value to the Obligation Authority/Fund Cite Authorization (OA/FCA) amount and accomplishes fund control using management categories specified by the combatant commands. Obligations and disbursements are recorded in the system for internal management use and to be fed to the official accounting system.

The Security Assistance Automated Resource Management Suite serves as a feeder system for the DFAS-DE BQ accounting system. The Department of Defense considers the data residing in

SAARMS as unofficial accounting information. The data in the DFAS-DE BQ system is accepted as the official accounting information. This system receives data from the DoS accounting system and SAARMS. The SAARMS feeder process is currently accomplished by the SAO generating an obligation disbursement report and data file and then transmitting those files to a central location on the Security Assistance Network (SAN). The SAN is a password protected website for use by the security cooperation community. The International Security Assistance Automated Resource Management Suite (ISAARMS) is a restricted access budget system within the SAN. Access to the SAN is limited to those with appropriate user identification and password with further access limited to ISAARMS according to user requirements by tying access to the user identification. Country budget personnel are limited to accessing their country's data only. Unified command budget personnel are limited to accessing the data of the countries in their region. DFAS budget personnel and select DISAM personnel have access to all countries' data. The SAN stores the appropriate files and then once a month consolidates all the accounting files for DFAS-DE to download into the DFAS-DE BQ accounting system.

This is a cumbersome and slow process prone to errors. DISAM receives numerous help desk requests for support at the end of each month during the upload process. The users have problems due to data corruption, internet connectivity, or operator errors from lack of continuous use. All countries are required to upload their data within a specified time frame during the month. The contractor supporting the ISAARMS is also required to process the consolidation of the countries for DFAS-DE to download within a specified time frame. If a country's data is not uploaded during the available window then the data will not be processed until the following month. DFAS-DE downloads the data and loads it into the DFAS-DE BQ accounting system. This data must also be processed in a specific time frame because DFAS-DE is required to provide the Office of Management and Budget (OMB) with a report by a specific date each month. The feeder process is cumbersome and results in data generally being thirty days or more out of date.

Fielding routine software updates is just as cumbersome as the feeder data process. The software is only updated annually to limit the number of field installations. Each country is provided with copies of the software on CD-ROM. One region of the world uses a contractor to manage their local area network (LAN) and are the only ones authorized to install software. The contractor installs software during field maintenance cycles or processes the installation for each country from a central location using remote software. When everything goes according to plan this process works fairly well. The other four regions of the world rely on the users to install their own software. The SAOs are offices of one to fifty people. The level of computer literacy and technical support capabilities vary greatly from one country to another. The yearly installation process generally results in numerous help desk requests.

The installation of software updates is cumbersome, but the backup of data is crucial. An SAO may have thousands of transactions stored in their database. Each SAO performs a backup of their data and keeps it on a floppy disk in order to reconstitute their accounting data in the event the computer fails. The embassy bombing in Kenya identified the need to keep this backup file outside the SAO office [Marme, 2002]. The budget analyst was among those killed in the explosion. The computer housing SAARMS and the backup disk were destroyed in the blast along with all the original paper documents. Reconstructing the budget data was rendered impossible. Due to this catastrophe, new procedures were implemented that require the SAOs to make a backup of their data and upload it to ISAARMS at least once a month. This process is time consuming and prone to the same cumbersome tasks as the feeder data upload process. Reconstitution of data could also potentially lose data processed during the last thirty days.

Loading funding authorizations is another area that is not performed on a routine basis. The initial OA/FCA is loaded into SAARMS each October and then once each quarter. This process

includes loading the legal funding limit, new expense codes, and funds allocations by OMB object class. Because this is only accomplished four times a year, the error rate is very high. SAARMS was modified to allow the unified command budget analysts to load each country's AO/FCA and email a file as an attachment to then be imported electronically into each country's SAARMS program. This has helped alleviate the errors, but is burdensome and time consuming for the combatant command. The combatant command has to load each country and create the import file one at a time. They often have to provide support via the telephone for the country budget analyst to import the file.

As noted, DFAS-DE uses the SAARMS data to feed their DFAS-DE BQ accounting system, but DSCA and the combatant commands use the data for financial analysis. DSCA and the combatant commands obtain their data from ISAARMS. Under this process the data being used is routinely up to thirty days out of date. The only way to get more timely data under the current system is to have each country upload their data more frequently. Additional uploads would require the countries to take time from other functions for the sole purpose of providing higher headquarters with more timely information.

The budget analysts in the SAOs routinely use various databases and regulations available on the internet. The current software cannot easily incorporate these resources because of the constant change in web addresses and inability of the program to initiate user access to the web when required. It is also difficult to interface multiple stand-alone databases with web-based databases. The new Defense Travel System scheduled for implementation at the SAOs next year is a prime example of a system that would benefit the SAOs if it could connect to the SAARMS.

In summary, SAARMS is a stand-alone database program with certain inherent limitations caused by lack of full interoperability with all units involved in the budget process. Uploading feeder data information is awkward and requires monthly technical support by the users. Installation of software updates requires similar technical support. Loading OA/FCAs are prone to error and only partially helped with the unified command creating a file for import by the SAOs. Financial analysis of the countries accounting data by DSCA and the combatant commands is often limited to outdated information. SAARMS is also very limited in its ability to utilize available databases on the internet.

Advantages of a Web-based Security Assistance Automated Resource Management Suite

A web-based database has potential to expand the capability and effectiveness of SAARMS. Web-based databases have been efficient and effective for many public sector organizations. The internet and associated technologies can be essential tools to efficient operations of government organizations. Thuraisingham [1999] posits that electronic commerce is becoming the most important web-based information management application. Greenberg et al., [2000] demonstrated the efficiencies obtained by using an internet-based database to support Brownfield redevelopment. The internet was used to efficiently and effectively input data and to interact with data input from multiple locations.

The US Department of Agriculture effectively used a web-based database to support the agrometeorological field [Doraiswamy, et al, 2000]. This web-based database allowed users around the world to access the agrometeorological data. It also allowed users to analyze the data using the more powerful processing capability of a central database. A web-based database containing soil test data was effectively used to provide increased access to data and faster processing to support laboratories and their clients [Motavalli et al., 2002]. The ability to work with the database via the web reduced the time required to process tests and allowed for faster more expansive analysis of available data.

Legacy databases are a valuable resource that could be better utilized if available to a broader audience using a web-based application [Jameson & Cook, 2002]. A web-based database can improve productivity, reduce costs, and make sharing information throughout the company easier. A web-based SAARMS would alleviate the need for users to upload feeder data and backup files through the ISAARMS system. The users in the SAOs and the combatant commands would have direct access to load data if required. This would allow the combatant commands to load the quarterly OA/FCAs in SAARMS reducing data entry errors and technical support for SAOs.

Accounting oversight is required for DFAS, DSCA, and the combatant commands. A web-based database with select queries can be used to provide accounting oversight and compliance assurance of field activities [Borthick, Jones, & Kim, 2001]. The existing SAARMS program requires each country to upload their data via the ISAARMS and the reviewing activity must download the data for each country to be analyzed. If the reviewing activity desires to analyze more than one country they are required to download each country's data and then merge the files together. The internet can be used to make an organization's database available throughout the world [Malaika et al., 2002]. The internet can therefore make the accounting data available to DSCA, DFAS, and the combatant commands in real time instead of the thirty day lag time currently experienced.

SAARMS is also very limited in its ability to utilize available databases on the internet. The majority of Department of Defense regulations, manuals, and publications are available on the internet. The new defense travel system will be available on the web. There are numerous government and commercial databases that are available on the internet as well. Hotel, rental car, airline, pay scales, and per diem rates are examples of databases that are utilized by the budget analysts in the SAOs. Currently SAARMS users must connect to the internet and locate these sources on their own.

Migrating SAARMS to the web would allow SAARMS to directly interact with other databases. The capability to connect multiple external databases to an organization's web-based database currently exists [Malaika et al., 2002]. A web-based SAARMS could therefore make interactions with some of these databases available to the users to obtain reference material. It could also connect directly with the databases and become integral parts of the program. This could greatly enhance the utility of SAARMS.

Security of the accounting data was identified early on in the development of SAARMS as a crucial requirement. This was achieved through the security provisions included in the database platform used in previous and existing versions of SAARMS for use on individual computers or local area networks only. Security on the internet adds new dimensions to the problem and has been identified as a major concern when developing a web-based database [Thuraisingham, 1999], [Kulkarni & Marietta, 2000], [Papastavou et al., 2001], [Motavalli et al., 2002], [Bergstrom, 2002]. Additional security restrictions may be required to support data restriction and privacy protection [Motavalli et al., 2002].

The internet can allow an organization to share data across the organization at multiple locations with restricted access to all or portions of the data [Kulkarni & Marietta, 2000]. The web server can provide the domain level access control and user authentication. Security can also be included at the database level. There are several database applications that support internal data security. Microsoft Access, Filemaker Pro, and Oracle all provide security within the database. Internet security can be achieved with the aid of available applications as well. JAVA Applets are one method to add security to the internet by the client downloading these applets to their computer. [Papastavou et al., 2001]. Implemented Secure Socket Layer to insure security of data as Statistics Norway did is another method of obtaining security [Bergstrom, 2002].

Installation of SAARMS software updates requires extensive technical support. The users would not need to install the SAARMS software on their computers if SAARMS were web-based. Bergstrom [2002] observed that installation in users computers was too complex and difficult for stand alone software but the use of the web alleviated the problem. Web technology is distributed throughout the world, it is not platform dependent, and web applications are easy to use [Jameson & Cook, 2002]. JAVA Applets could potentially be implemented for added security and would require the users to download and install [Papastavou et al., 2001]. This is one area that potentially could require some technical support. DISAM has experienced numerous download issues with JAVA Applets when clients attempted to use an Air Force developed computer security course on a database using these applets. The actual installation requirements for a web-based SAARMS would require additional research once a database platform was selected and appropriate security measures determined.

Developing a Web-based Security Assistance Automated Resource Management Suite

A web-based SAARMS will solve many problems currently associated with using a stand-alone database and provide for added efficiencies. There are costs associated with converting a legacy system to a web-based system and other issues that require consideration. Hardware, software, ease of implementation, portability, technology support, security, maintenance, and relative cost issues have all been identified as issues requiring consideration [Jameson & Cook, 2002]. Decisions on who will manage the program, who will code it, and the location of the server, will also need to be made.

DISAM centrally procures hardware for the SAOs. This hardware is configured to support running a Microsoft Access database. The SAO's would not need Microsoft Access loaded on their computer if they were only required to access the database using the internet. A lower level configuration would be adequate at the SAO level. A computer to host the server with enough capability to support a database accommodating over 100 countries' data and processing queries will be required.

Additional software will be required for loading on the server computer. There are several software programs to aid in web-based database development. Microsoft Access, Filemaker Pro, DB2, Approach, and Paradox can be used for this purpose. Microsoft Access and Filemaker Pro were identified as low cost database programs that offer easy user interface and require limited programming experience. [Kulkarni & Marietta, 2000]. Microsoft Access 97 was identified as a more powerful program for publishing on the internet than Approach 97 or Paradox 97 [Hayes & Hunton, 1999]. Microsoft Access and Filemaker Pro can be used for developing a web-based database but do not provide the best performance for searching large data fields [Kulkarni & Marietta, 2000]. DB2 supports web-based development as well [Malaika et al., 2002]. Additional research on the optimum database program will be required before selecting the appropriate development tool.

Ease of implementation is one of the drawbacks to the current SAARMS program. A web-based database could require nothing more than internet access and a web browser to those items, plus some downloaded programs like JAVA Applets often required for security purposes when using JAVA. What is required to be loaded for implementation of a web-based SAARMS will be dependent on the database and Internet access programs used. A web-based SAARMS should be fairly easy to implement.

Portability is one of the best features of a web-based database. The SAOs, DFAS, DSCA, the combatant commands and DISAM will all have access to the same timely data from any location in the world with internet access. When a SAO's budget officer is on temporary duty at another location they can still access and update the data in SAARMS. The unified command budget

officer can perform the budget functions in SAARMS for the SAO in the absence of the SAO budget officer.

Requirements for technology support would be reduced with a web-based SAARMS. Web technology is distributed throughout the world, it is not platform dependent, and web applications are easy to use [Jameson & Cook, 2002]. Technology support for users would be reduced, but additional support for the program and a new server would be required.

Security on the internet is an issue with any database. Security can be established at the database level and the domain. JAVA Applets can be used to provide security for internet access and the database development program can provide data security [Papastavou et al., 2001], [Kulkarni & Marietta, 2000]. Additional research is required on the security requirements for SAARMS but will be dependent on the development program used and the security capabilities of the domain server.

Maintenance of a web-based SAARMS will be simpler than the existing program. Bug fixes can be made, tested, and immediately applied to the program without waiting for the annual release cycle. New enhancements can also be implemented when developed. There will be no requirement to provide any maintenance on programs loaded on users' computers in the field.

Who will write the code and manage the program are critical elements of developing a web-based SAARMS? SAARMS is currently managed by personnel at DISAM and could easily continue to be managed there. Writing the new code and maintaining the existing code could exceed the capacity of the small program office at DISAM. Reprioritizing workload at DISAM or contracting out the development are options that should be considered.

A decision on the location of the server is required before implementation of the program. DISAM and DSCA both have their own servers located at Wright-Patterson Air Force Base, Ohio. The Department of Defense has other sites that host servers and there are private contractors that could provide this support as well. Requirements for hours of operation, acceptable downtime, and accessibility of the programmers are issues that need to be addressed before making a decision on server location.

Costs associated with any new information technology must be considered prior to development. The SAOs currently have internet access so no additional costs would be associated with use of the internet. Allocating space on an existing server would have no direct new costs, but if the purchase of a new server were required, the cost of the hardware, software and installation would have to be calculated. The maintenance costs associated with a web-based database should be similar to those of the existing program. There will be costs associated with the program effort required to modify the existing SAARMS program to make it web-based or to develop a new SAARMS program on a different database program that is web enabled. Further research is required to determine what level of security will be required to meet the users needs. Then the security costs could then be calculated.

Conclusion

The Defense Security Cooperation Agency can achieve efficiencies and increased accounting oversight of the Security Assistance Organizations' security cooperation funds through migration of the SAARMS to the web. Legacy databases like SAARMS are valuable resources that could be better utilized if available as a web-based application. [Jameson & Cook, 2002]. The internet has been successfully used to make information available for people working on Brownfield redevelopment. [Greenberg et al., 2000]. The US Department of Agriculture was successful in the agrometeorological field with the use of a web-based database as was the use of the web for soil test data [Doraiswamy et al., 2000], [Motavalli et al., 2002].

Several functions accomplished with the existing SAARMS could be done more efficiently through a web-based SAARMS. The existing system of uploading feeder data reports to the ISAARMS is slow, unwieldy, prone to errors, and the data is out of date when uploaded. A web-based SAARMS would not require the data to be uploaded because the data would be resident on the central server. This would make all the feeder data real time. Help desk requests should be reduced with the elimination of this complex process. Funding authorizations are currently loaded in the field with a high error rate. A web-based SAARMS would allow the combatant commands to load the data for the field allowing them more control of the funds and reduce the error rate. The combatant commands and DFAS are currently limited to performing accounting oversight reviews and other accounting analysis once a month. A web-based SAARMS would allow both organizations to conduct these functions at anytime with the most current information.

The existing data is vulnerable at the embassies. Time constraints limit the number of off site backups of data to once a month by each SAO. The loss of data on site close to the end of the month would require the SAO to reconstruct up to thirty days worth of data, if the backup documentation were available, and the complete loss of that data if the backup documentation were not available. The data on the server could be set to automatically backup locally and sent offsite as often as required.

Web-based database software could be updated as needed with bug fixes and enhancements available immediately instead of yearly with the existing difficult process of updating software. Databases and other resources available on the internet could be made available within a web-based database for enhanced features to support the SAO budget officer. SAARMS could be used from anywhere around the world. SAOs would have access to their program while on temporary duty or on leave. The combatant commands and other SAOs could perform accounting functions for another SAO while the budget officer is not available.

One problem to be addressed with the migration of SAARMS to a web-based application deals with security. Security becomes more difficult with a web-based application [Kulkarni & Marietta, 2000]. Security at the database level and the domain level will need to be addressed. The level of security required will have to be determined based on DoD regulations and the requirements of the users. Once these requirements are determined then a decision will be required to determine the best methods to achieve that level of security.

There are four other major decisions that will have to be made prior to migration of SAARMS to a web-based application. SAARMS is currently managed by DISAM as a small database application. A decision will be required on who should manage this program in the future. The capabilities of DISAM personnel and the new requirements will need to be determined prior to this decision. A decision on who will write the code will also need to be made. DISAM does not have excess programming capacity and would require support or suspension of maintenance of the existing SAARMS in order to have time to write the new code. Depending on the software selected for development DISAM may not have the expertise to write the code. The software package for both the database and web interface will have to be decided. The location of the server will have to be determined as well.

A final consideration to make is the cost of the migration. Once the migration of SAARMS is completed the costs of maintenance should be similar to the current costs. Maintaining the database would cost the same with the exception of updates. The cost of producing and shipping CDs around the world and the time lost of help desk support for local installs would no longer exist. Added support costs would be associated with the maintenance of the server but much of this would be off set by the elimination of the requirement for the ISAARMS.

No attempt was made in this paper to make a cost analysis and financial business case for migration to the web. The available literature supports the conclusion that a web-based database can be an efficient and effective tool for public sector organizations. A web-based SAARMS offers several enhancements over the existing program. Several decisions need to be made prior to the migration of SAARMS to a web-based database. Additional research on these decision areas is required. A cost analysis considering all the costs associated with the migration and the added functionality should also be made prior to a final decision on migration of the Security Assistance Automate Resource Management Suite to a web-based application.

About the Author

Ernest B. McCallister is currently the Director of Academic Support at the Defense Institute of Security Assistance Management. He has over nine years of experience as an associate professor for the management of security assistance. His security cooperation and logistics experience includes five years at the Air Force Materiel Command and four years as a program and country manager at the Air Force Security Assistance Center. He has been involved with software programming and teaching of the Security Assistance Automated Resource Management Suite for over nine years. His education includes a Bachelor of Science from The Ohio State University, a Masters of Business Administration from the University of Toledo, and is currently a Doctoral Candidate at Walden University.

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